



2.0 How Good the Impact Assessment Results Must Be

This section consists of requirements which specify the fidelity of the assessment results. Fidelity, as discussed above in the section on Principles and General Requirements, is used in this assessment in the same sense it is used in high fidelity sound reproduction, that is, it expresses the degree to which the reproduction (the assessment in this case) faithfully represents the actual performance (reality), overcoming any intrusion of factors which introduce distorting noise or bias.

Appendix II-B lists these requirements in four subject areas: (1) achieving sufficient assessment sensitivity to detect any potential adverse effects/impact, (2) ensuring seamless consistency across all models and calculation modules, (3) selecting the study set of factors and the specific fidelity requirements for the candidate factors discussed in Appendix II-A, Sections 1.0 through 9.0, and (4) ensuring software characteristics meet assessment needs.

2.1 Fidelity of Detecting Harmful Effects

These requirements specify that the assessment must be designed and conducted well enough that if an adverse effect is occurring or will occur, the assessment will identify or predict it. Deciding what constitutes an impact is discussed in the Principles and General Requirements section. It should also be kept in mind who the users of the assessment results are expected to be and for what purposes would they use the results (see Introduction).

Applying such a qualitative concept as fidelity to modeling and calculation tasks requires the use of what one regards as important. Relative importance, or value, is rooted in one's culture and lifestyle. What is seen as an impact to which the assessment must be sensitive is very much a matter of who the affected peoples are and what is important to them. Especially for this reason the CRCIA Board's guidance or approval must be sought in matters of this kind.

Two general factors will be frequent threats to needed fidelity. One is the fineness of definition in determining the timing of contaminant releases, groundwater migration rates, food chain and other pathway assimilation rates, and eventually, the duration and intensity of the exposures — especially combinations of exposures. The second factor is that it may be difficult to resolve the large geographic area being assessed into elements that are fine enough to detect contamination hot spots and the degree to which they coincide with critical uptake locations such as municipal water intakes and favored habitat. These are particularly critical considerations to the assessment and must be dealt with effectively.

In keeping with the principle of dominance (see Principles and General Requirements above), resources may not always be sufficient to support enough assessment work to include all the factors necessary to detect all impact for all the selected receptors of interest. Difficult choices may have to be made between assessing all potential impact or all receptors of interest. The CRCIA Board must make these decisions. However, the analysts will develop and use trade study methods to define the choices to be presented to the Board.



2.2 Model Integration and Consistency

These requirements are aimed at ensuring the insightful integration of the many assessment models and calculations such that overall fidelity is not degraded. For example, unless uncertainty is managed with consistency across all models, detection of important effects may be needlessly masked by the error band surrounding the final results. As discussed in Section 1.0 above (see Figure 3), the assessment task modules, especially those involving modeling and calculations, are highly dependent on one another. If output of one module is inadequate to properly enable the next module to function, fidelity will be lost to the overall assessment results. Seamlessness must be achieved across module boundaries. For instance, mass and momentum must be conserved between vadose zone models and groundwater models. This is an illustration of why the analysts must be cautious in accepting results and tools from other studies.

2.3 Selecting Factors for Assessment: The Study Set

This section deals with the fidelity requirements which apply to respective modules of the assessment addressed in Appendix II-A and Sections 1.0-1.9 above. Topics include:

- ◆ Screening candidate contaminants to identify those having the most dominant effects
- ◆ Development and use of transport models to preserve the needed sensitivity to timing and location (see Section 2.1 above)
- ◆ Search, discovery, and modeling of the most important habitat and uptake locations
- ◆ Receptor selection and exposure pathway web modeling
- ◆ Chemical and radiological dose calculation for single and multiple contaminants
- ◆ Selecting dominant effects

2.4 Assessment Software Requirements

This section contains the requirements to be observed in using commercial modeling software and in developing unique software for this assessment. The section specifies that software specifications will be prepared, that software verification and validation be performed, and that a software quality assurance plan be prepared and implemented.

2.5 Assurance of Assessment Quality

A concept of assessment quality will be developed which includes the principles of fidelity, management of uncertainty, dominance, the development of CRCIA standards, and required results. These topics have all been addressed previously. In addition, workable concepts for the management and reconciliation of work scope and funding must be developed in keeping with the principle of dominance yet ensuring that the most important assessment work is accomplished to high professional standards. Particular attention will be directed to validation of all models used in the assessment.

An assessment quality assurance plan will be prepared which defines how quality is to be infused into the assessment and maintained. The CRCIA Board must approve the quality assurance plan.